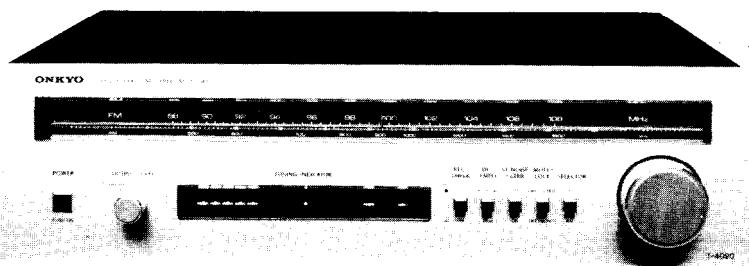


# ONKYO® SERVICE MANUAL

## QUARTZ LOCKED STEREO TUNER MODEL T-4090



**ONKYO®**  
**AUDIO COMPONENTS**

**SPECIFICATIONS****120V model****FM Section**

Tuning Range:	88 ~ 108 MHz
Usable Sensitivity:	mono: 9.8 dBf, 1.7 $\mu$ V stereo: 17.2 dBf, 4 $\mu$ V
50 dB Quieting sensitivity:	mono: 14.7 dBf, 3 $\mu$ V stereo: 36 dBf, 35 $\mu$ V
Intermediate Frequency:	10.7 MHz
Capture Ratio:	1.3 dB
Image Rejection Ratio:	90 dB
IF Rejection Ratio:	100 dB
Spurious Rejection Ratio:	95 dB
Signal-to-Noise Ratio:	mono: 76 dB stereo: 68 dB
Alternate channel att:	70 dB
AM Suppression Ratio:	55 dB
Harmonic Distortion:	mono: 0.1% stereo: 0.25%
Stereo Separation:	40 dB at 1 kHz 35 dB at 70 ~ 10,000 Hz
Subcarrier Suppression:	60 dB
Muting Level:	17.2 dBf, 4 $\mu$ V
Stereo Threshold:	17.2 dBf, 4 $\mu$ V
Quartz Lock Level:	17.2 dBf, 4 $\mu$ V
Frequency Response:	30 ~ 15,000 Hz + 0.5, -1.5 dB

**AM Section**

Tuning Range:	525 ~ 1605 kHz
Usable Sensitivity:	25 $\mu$ V
Intermediate Frequency:	455 kHz
Image Rejection Ratio:	50 dB
IF Rejection Ratio:	40 dB
Signal-to-Noise Ratio:	45 dB
Harmonic Distortion:	0.7%

**GENERAL**

Power Supply Rating:	AC 120 volts 60 Hz
Output Voltage:	FM: 0 ~ 1.5 volts AM: 0 ~ 0.5 volts
Outputs:	OUTPUT (variable)
Inputs:	FM and AM Antenna
Antennas:	FM: 300 ohms balanced and 75 ohms unbalanced AM: built-in ferrite core antenna and external terminal
Semiconductors:	1 FET, 9 ICs, 28 transistors, 25 diodes
Dimensions:	418(W) x 124(H) x 399(D) mm 16-1/2" x 4-15/16" x 15-3/4"
Weight:	5.9 kg (13 lbs.)

In the interest of further product improvements, specifications are subject to change without notice.

**Universal model****FM Section**

Tuning Range:	87.5 ~ 108 MHz
Usable Sensitivity:	mono: 1.3 $\mu$ V DIN (S/N 26 dB, 40 kHz devi.)
50 dB Quieting sensitivity:	1.7 $\mu$ V, 9.8 dBf IHF
Intermediate Frequency:	45 $\mu$ V DIN (S/N 46 dB, 40 kHz devi.)
Capture Ratio:	3 $\mu$ V, 14.7 dBf

**50 dB Quieting sensitivity:**

Intermediate Frequency: 10.7 MHz

Capture Ratio: 1.3 dB

Image Rejection Ratio: 90 dB

IF Rejection Ratio: 100 dB

Spurious Rejection Ratio: 95 dB

Signal-to-Noise Ratio: mono: 76 dB

stereo: 68 dB

Alternate channel att.: 80 dB (IHF)

Selectivity: 70 dB (DIN)

( $\pm$ 300 kHz, 40 kHz devi.)

AM Suppression Ratio: 55 dB

Harmonic Distortion: mono: 0.1%

stereo: 0.25%

Stereo Separation: 40 dB at 1 kHz

35 dB at 70 ~ 10,000 Hz

Subcarrier Suppression: 60 dB

Muting Level: 4  $\mu$ V

Stereo Threshold: 4  $\mu$ V

Quartz Lock Level: 4  $\mu$ V

Frequency Response: 30 ~ 15,000 Hz + 0.5, -1.5 dB

**AM Section**

Tuning Range:	525 ~ 1605 kHz
Usable Sensitivity:	25 $\mu$ V
Intermediate Frequency:	455 kHz
Image Rejection Ratio:	50 dB
IF Rejection Ratio:	40 dB
Signal-to-Noise Ratio:	45 dB
Harmonic Distortion:	0.7%

**GENERAL**

Power Supply Rating: AC: 110/120/220/240 volts  
50/60 Hz

Output Voltage: FM: 0 ~ 1.5 volts

AM: 0 ~ 0.5 volts

Outputs: OUTPUT (variable)

Inputs: FM and AM Antenna

Antennas: FM: 300 ohms balanced and  
75 ohms unbalanced

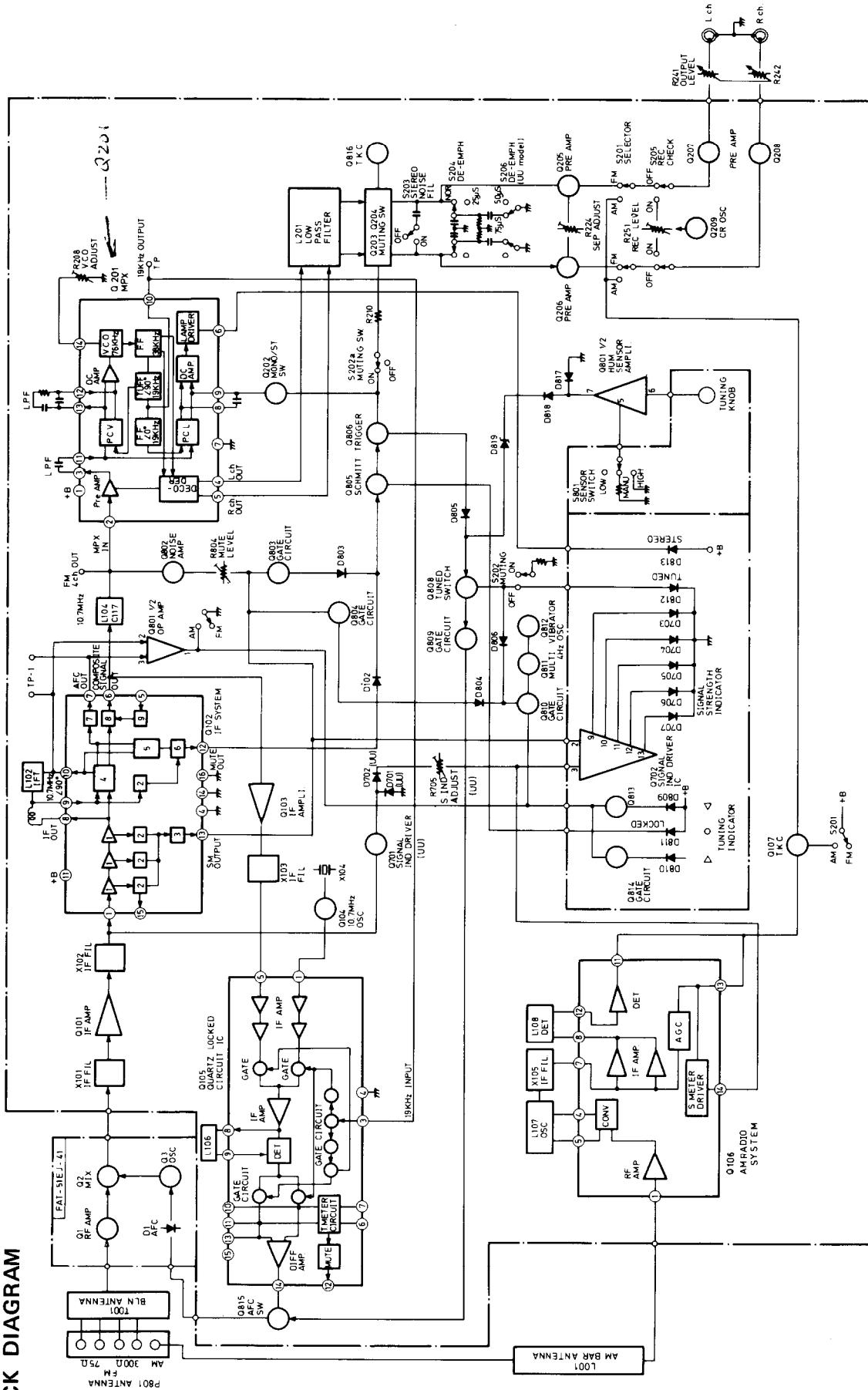
AM: built-in ferrite core  
antenna and external terminal  
1 FET, 9 IC's, 29 transistors,  
27 diodes

Semiconductors: 418(W) x 124(H) x 399(D) mm

Dimensions: 16-1/2" x 4-15/16" x 15-3/4"

Weight: 5.9 kg (13 lbs.)

In the interest of further product improvements, specifications are subject to change without notice.

**BLOCK DIAGRAM****MPX DECODER IC**

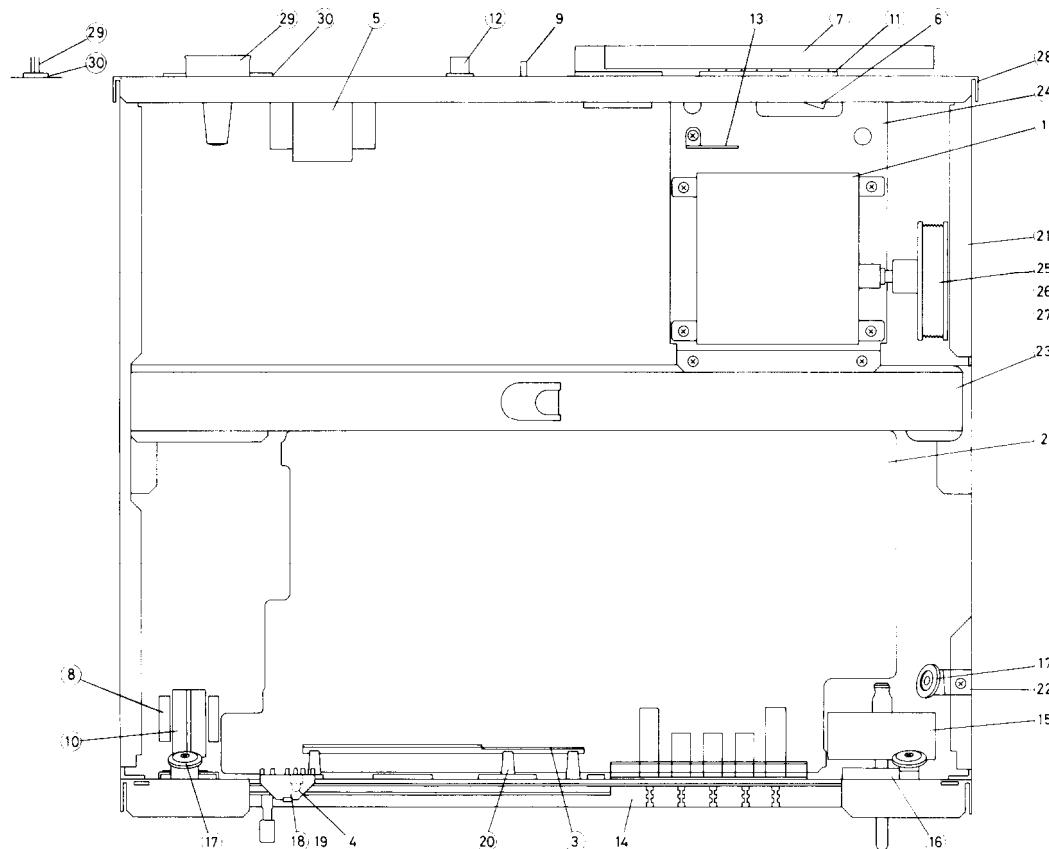
- P.C.V.: Phase comparator for V.C.O
- P.C.L.: Phase comparator for lamp
- TUFF: Direct coupled type flip-flop
- V.C.O.: Voltage controlled oscillator
- L.P.F.: Low pass filter

**IF SYSTEM IC**

- 1. IF amplifier
- 2. Level detector
- 3. Signal meter circuit
- 4. Quadrature detector
- 5. OV switch
- 6. Muting drive circuit
- 7. AFC amplifier
- 8. Audio amplifier
- 9. Audio muting circuit

NOTE: (UU): Only Universal model

## COMPONENT LOCATION



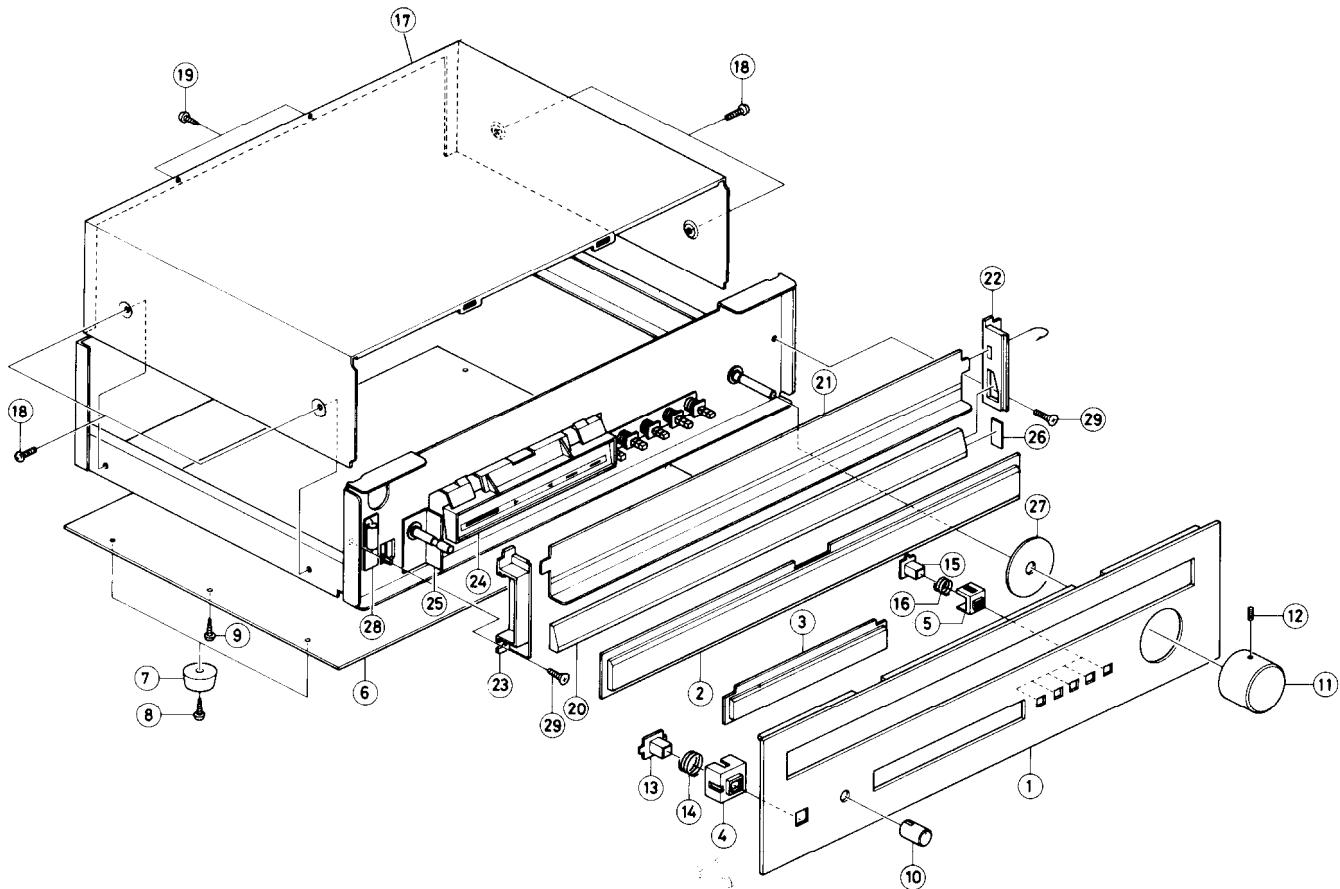
## PARTS LIST

## 120V model

## Universal model

REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION	REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
1	U1	240038	FAT-51UJ-41, FM front end	1	U1	240038	FAT-51UJ-41, FM front end
2	U2	13639536	NARF-636, FM/AM tuner p.c.b.	2	U2	13640536A	NARF-636a, FM/AM tuner p.c.b.
3	U3	13639537	NADIS-637, Indicator p.c.b.	3	U3	13639537	NADIS-637, Indicator p.c.b.
4	PL802, PL803	210057	PL6.3V, 0.15AW 1.5, Indicator light	4	PL802, PL803	210057	PL6.3V, 0.15AW 1.5, Indicator light
5	T901	230284A	NPT-669D, Power transformer	5	T901	230285	NPT-669ADGQ, Power transformer
6	T001	233026	NBLN-1, Balun transformer	6	T001	233036	NBLN-1, Balun transformer
7	L001	232066	NMA-3012, AM bar antenna	7	L001	232066	NMA-3012, AM bar antenna
8	C901	3504012	UL125V103M, UL capacitor	8	C901,C902	3500052	PME271Y510CEE, IS capacitor
9	S801	25065016	NSS-2327, Hum sensor selector switch	9	S801	25065016	NSS-2327, Hum sensor selector switch
10	S901	25035135	NPS-111-L100P, Power switch	10	S901	25035136	NPS-121-101P, Power switch
11	P801	25060021B	NTM-3PUM1, Antenna terminal	11	P801	25060021B	NTM-3PUM1, Antenna terminal
12	P802	25045026	NPJ-2PRBL04, Output terminal	12	P802	25045026	NPJ-2PRBL04, Output terminal
13	P803	251070	LG-2L, Terminal	13	P803	251070	LG-2L, Terminal
14	A001	27110080	Front bracket	14	A001	27110080	Front bracket
15	A002	27205017	Drive shaft	15	A002	27205017	Drive shaft
16	A003	27300071	Bearing	16	A003	27300071	Bearing
17		27185002A	Dial pulley	17		27185002A	Dial pulley
18	A005	27220011	Slider, pointer	18	A005	27220011	Slider, point
19	A006	28165047	Pointer	19	A006	28165047	Pointer
20	A012	27190045	Holder, indicator p.c.b.	20	A012	27190045	Holder, indicator p.c.b.
21	A030	27115043A	Side bracket	21	A030	27115043A	Side bracket
22	A031	27140269	Bracket, pulley	22	A031	27140269	Bracket, pulley
23	A032	27130149A	Bracket, AM/FM tuner p.c.b.	23	A032	27130149A	Bracket, AM/FM tuner p.c.b.
24	A033	27130150	Bracket	24	A033	27130150	Bracket
25	A034	270760A	250mm, Dial drum	25	A034	270760A	250mm, Dial drum
26	A035	273803	SP-14A, Spring, dial drum	26	A035	273803	SP-14A, Spring, dial drum
27	A036	273903	155cm, Stringing	27	A036	273903	155cm, Stringing
28	A049	27120159	Back panel	28	A049	27120160	Back panel
29	W901	253099	AS-UC-3, Power supply cord	29	F901	252023	0.5A-T, Fuse
30	W901a	270025	3R-3P-4, Strainrelief	30	F901a	25050021	X-I7240, Voltage selector
						25050018	PA-125, 3P inlet

## EXPLODED VIEW



## EXPLODED VIEW – PARTS LIST

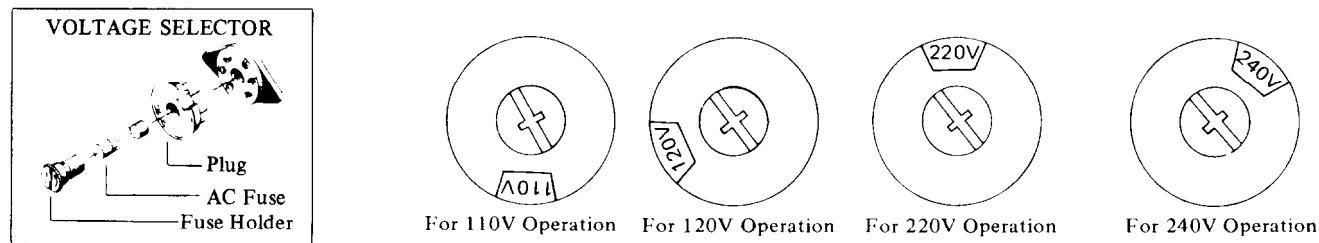
REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
1	13639121-1	Front panel ass'y (1, 2, 3)	15	28320318	Push switch knob
1	27210123	Front panel	16	27180037	Spring
2	28191038	Dial glass	17	28184052	Top cover
3	28191037	Indicator glass	18	28140020	4t x 10 x 40, Cushion
4	27267048	Guide, power switch	19	838440109	4TTB+10C(BC), screw
5	27267049	Guide, push switch	19	834430062	3STS+6BQ(BC), screw
6	27170055	Bottom board	20	28130076A	Dial plate
7	27175009	Leg	21	28133014	Back plate
8	831130162	3STW+16BQ, Tapping screw	22	27250026	Lamp case (R)
9	831130082	3STW+8BQ, Tapping screw	23	27250027	Lamp case (L)
10	28320316	Output level control knob	24	27190045	Holder
11	28320309	Tuning knob	25	27240019	Illumination bracket
12	801146	4 x 6, Screw	26	262003	Tape
13	13639125	Power switch knob ass'y (4, 13, 14)	27	28140126	Cushion
13	28320319	Power switch knob	28	13639539	Dial illumination lamp p.c.b.
14	27180038	Spring	29	210064	250mA, 6.3V, Dial illumination lamp
15	13639126	Push switch knob ass'y (5, 15, 16)		831130082	3STW+8BQ, Tapping screw

## SERVICE PROCEDURES

### 1. REPLACING THE AC FUSE Universal Model

This model is equipped with a universal power transformer to permit operation at either power source of 110, 120, 220 or 240V AC 50/60Hz.

To convert the unit to a different power source voltage, change the plug as illustrated in the drawing below.



**CAUTIONS:** 1. For continued protection against fire hazard, replace only with same type and same rating fuse.

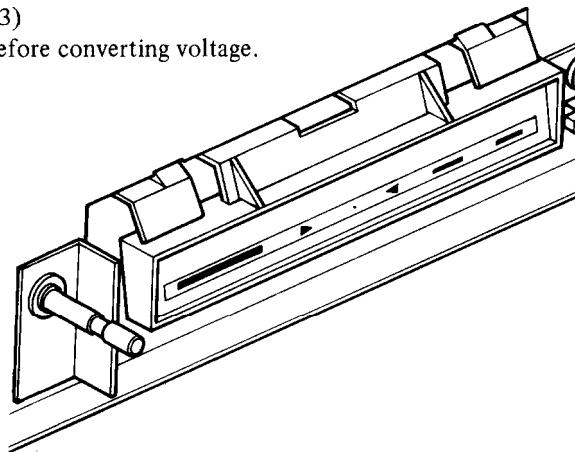
110/120V model 1A-T (Parts No. 252001)

220/240V model 0.5A-T (Parts No. 252023)

2. Disconnect power supply cord from AC outlet before converting voltage.

### 2. REPLACING THE HOLDER OF INDICATOR

1. Remove the two screws holding the top cover and back panel.
2. Remove the four screws holding the top cover and side brackets.
3. Pull out the output level knob.
4. Remove the five screws holding the front panel and front bracket.
5. Disconnect the holder of indicator by pressing against the nails of holder from front side.



### 3. DE-EMPHASIS SWITCH

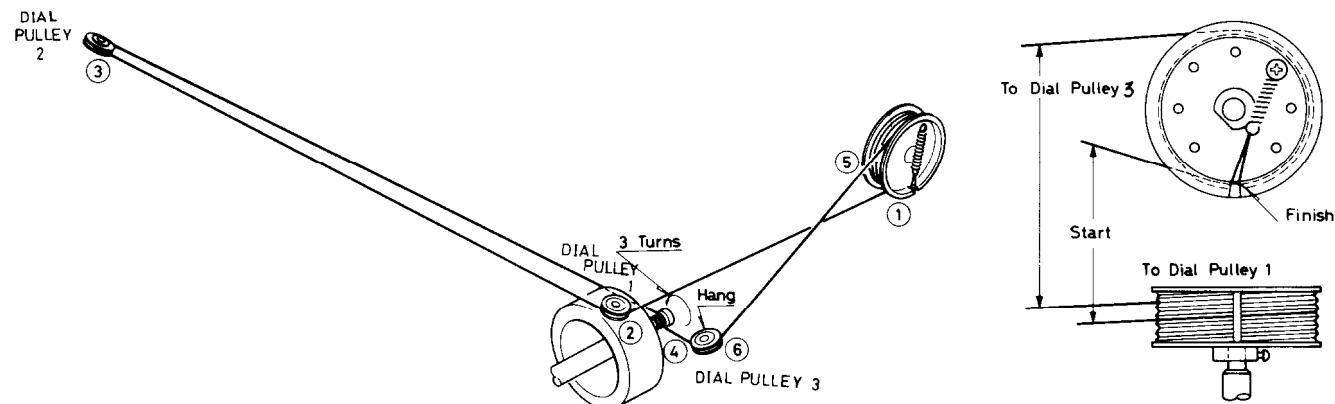
The 25μsec/Normal selector switch for Dolby FM broadcasts is located on the front panel. The 50μsec/75μsec selector switch employed in the Universal Type is located on the bottom board. When shipped from the factory, this bottom board switch is set to the 50μsec position. For use in 75μsec regions, switch over to the 75μsec position.

50μsec 75μSEC

### 4. SENSOR SWITCH

For matching the automatic FM tuning servo locked system to the various operating conditions. Set to LOW initially and switch to NORMAL or HIGH if the TUNED lamp does not turn off as soon as the tuning knob is touched.

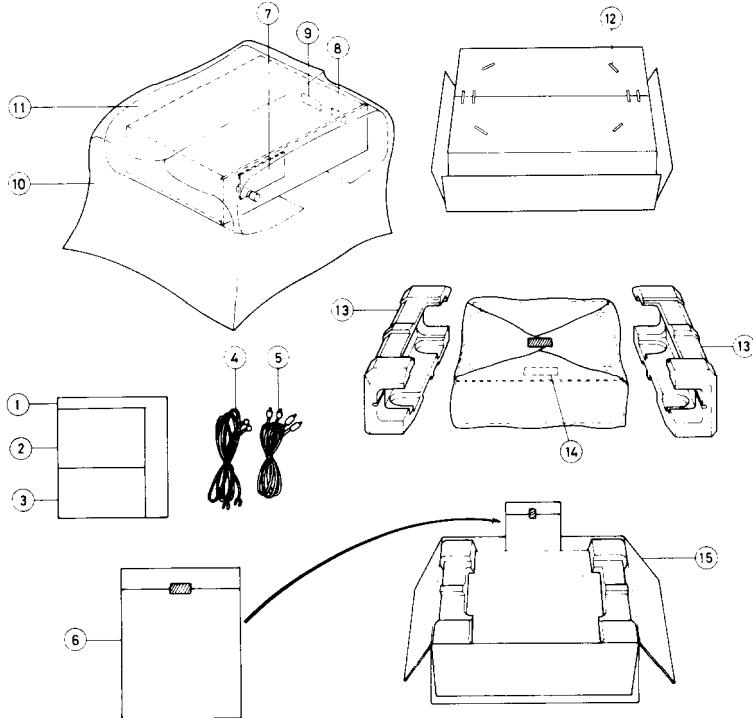
### STRINGING DIAGRAM



1. Close the variable capacitor complete and tie the dial cord to the spring of the drum.
2. Thread the dial cord in the direction of arrow from (1) to (3) and wind the dial cord three turns around the tuning shaft clockwise.
3. Wind the dial cord  $1\frac{1}{2}$  turns around the dial drum.
4. Thread the dial cord to the dial pulley 3.

## PACKING PROCEDURES

### 120V model

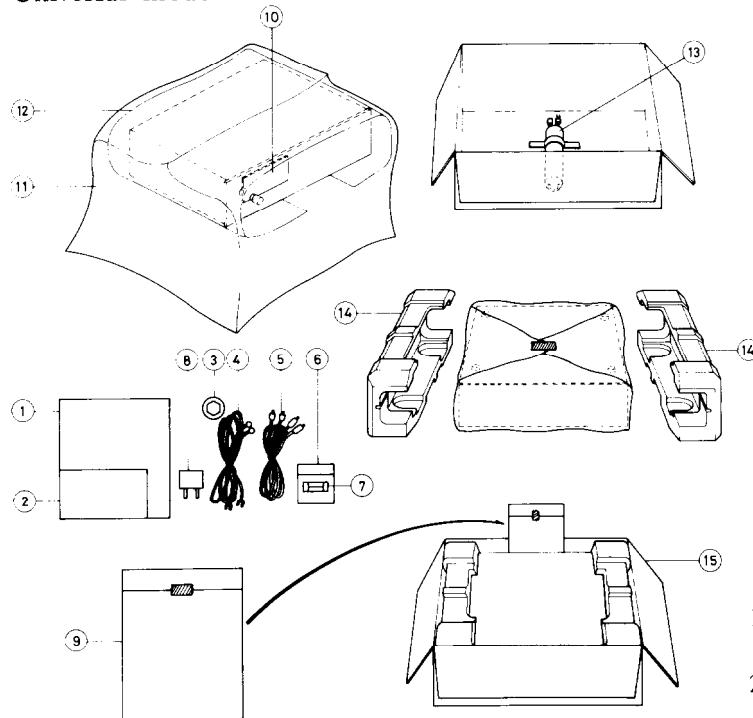


### PARTS LIST 120V model

REF. NO.	PARTS NO.	DESCRIPTION
1	29340321	Instruction manual
2	29358002	Service station list
3	29365006	Warranty card
4	292064	5059-01, FM antenna
5	253074	Connection cord
6	29100006	250 x 350mm, Poly bag
7	29355045	Sensor tag
8	29380040	Cabinet composite label
9	282969	Caution label A
10	29095012	500 x 800mm, Protection sheet
11	29100036	850 x 550mm, Poly bag
12	282301	Sealing hook
13	29090398	Pad
14	293041	Caution label
15	29050266	Carton box

1. All printed material and accessory items are placed in the poly bag.
2. The sensor tag is attached to the output level volume shaft.

### Universal model



### Universal model

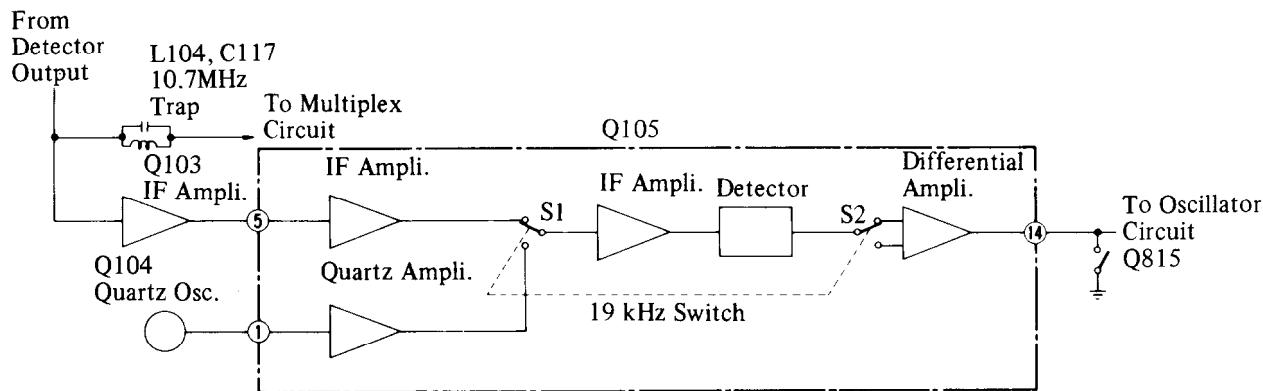
REF. NO.	PARTS NO.	DESCRIPTION
1	29340320	Instruction manual
2	29365005-1	Warranty card (G)
3	292075	Metal, "LOCKED"
4	292064	5059-01, FM antenna
5	253074	Connection cord
6	252001	1A-T, AC fuse (U)
7	25055018	CV-K-1, Conversion plug (U)
8	29100006	250 x 350mm, Poly bag
9	29355045	Sensor tag
10	29100036	850 x 550mm, Poly bag
11	29095012	500 x 800mm, Protection sheet
12	253089	Power supply cord (G)
13	13876801	Power supply cord (U)
14	29380038	Voltage tag
15	29090398	Pad
	29050266	Carton box

NOTE: (U): Universal model  
(G): only Germany model

1. All printed material and accessory items are placed in the poly bag.
2. The sensor tag is attached to the output level volume shaft.

## CIRCUIT DESCRIPTION

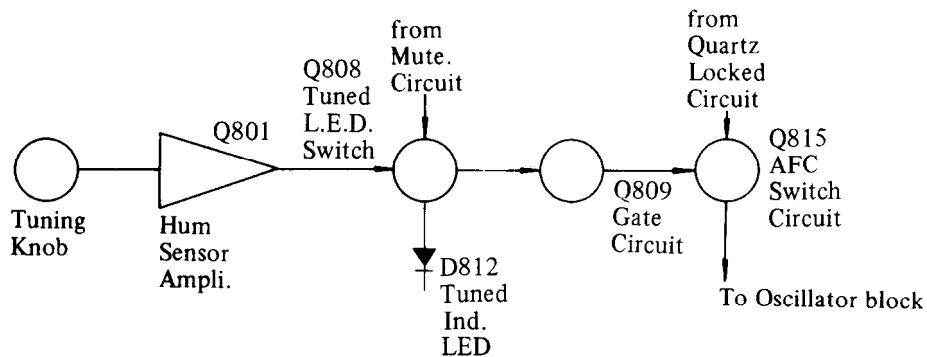
### 1. QUARTZ LOCKED CIRCUIT



The quartz locked circuit compares the frequency difference between the 10.7MHz reference signal and the IF signal, the difference being used to subsequently drive the AFC circuit.

A 10.7MHz component is extracted from the quadrature detector output by the L104 and C117 trap, amplified by the Q103 IC, and applied to pin no. 5 of the Q105 IC. An accurate 10.7MHz reference signal is generated by the quartz oscillator, and applied to pin no. 1 of the same IC. A 19kHz square wave is obtained from pin no. 10 of the PLL IC, and applied to pin no. 3 of Q105. The IF signal and the quartz oscillator reference signal are switched back and forth in a 19kHz cycle, and passed on to the detector and amplification stages. When S1 and S2 are both connected to the IF signal line, the IF frequency is detected, resulting in the generation of a voltage whose level corresponds to the IF frequency. This voltage is then applied to one of the differential amplifier inputs. When S1 and S2 are then both switched across to the quartz oscillator signal line, the quartz oscillator reference signal is detected, converted into the corresponding voltage, and applied to the other input of the differential amplifier. The difference between the IF detector DC component and quartz oscillator detector component is then amplified, appearing at pin no. 14 of the IC. This voltage serves as the AFC circuit control voltage. Any slight drift or deviation in the detector transformer will therefore result in the same amount of drift in both lines, thereby maintaining a constant difference. Precise local oscillator frequency will thus be kept at all times.

### 2. AFC SWITCHING CIRCUIT



In order to ensure accurate tuning, the AFC circuit is turned off automatically once the tuning knob is touched, and also when the muting circuit is switched off.

When a station is tuned, Q808 will turn off and Q809 turn on (since Q805 will already be off and Q806 on), resulting in the LOCKED lamp turning on. And since Q815 will turn off when Q809 turns on, the AFC circuit will also begin to operate.

When the tuning knob is touched, a certain amount of hum is induced. This hum is amplified by Q801, rectified (full-wave) by D817 and D818 into a DC signal, and applied to Q808 is consequently turned on, resulting in the AFC circuit being switched off. If, however, the hum level is rather low, the LOCKED lamp might not turn on even when the tuning knob is touched. If this happens, reset the rear panel sensor switch to either the Normal or High positions.

### 3. SIGNAL INDICATOR DRIVER CIRCUIT

The signal indicator driver circuit is activated by the detector of three or two point. Three point detector is used the Universal model and two point detector is used the 120V model. Q702 is the signal strength indicator driver IC. The IF signal is rectified by the IF level detector circuits and changed the DC component. The DC component applied to pin no. 2 and no. 3 of Q702 is amplified. The signal strength indicator LEDs connected to the IC output terminals pin nos. 9—13 are lit up in succession depending on the input level.

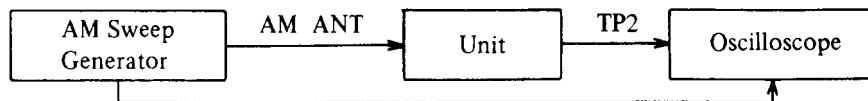
## ALIGNMENT PROCEDURES

### INSTRUMENTS REQUIRED

1. DC Voltmeter
2. AM Sweep Generator
3. AM/FM Signal Generator
4. AC VTVM
5. Oscilloscope
6. Monitorscope
7. Distortion Analyzer
8. Stereo Modulator
9. Frequency Counter

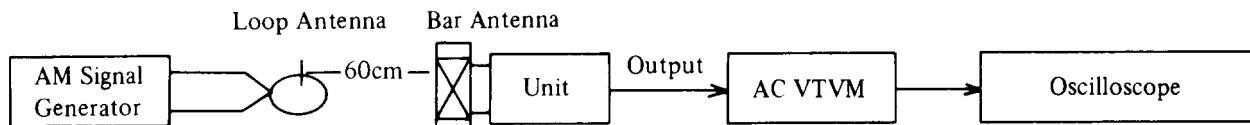
### (1) AM IF ALIGNMENT

1. Set SELECTOR switch to AM.
2. Set radio dial to quiet point.



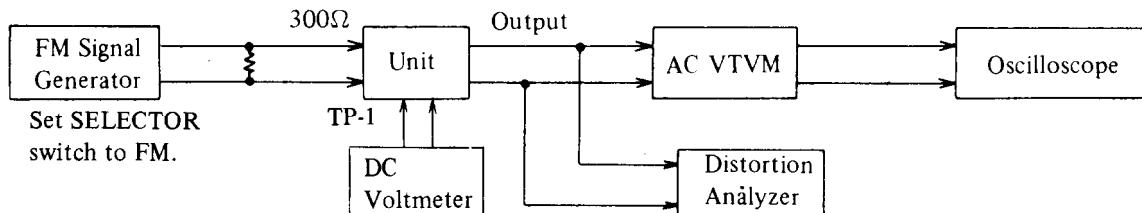
Set signal	Adjust	Oscilloscope	Remarks
455kHz	X105	Maximum Symmetrical Response	Usually not necessary to adjust

### (2) AM RF ALIGNMENT

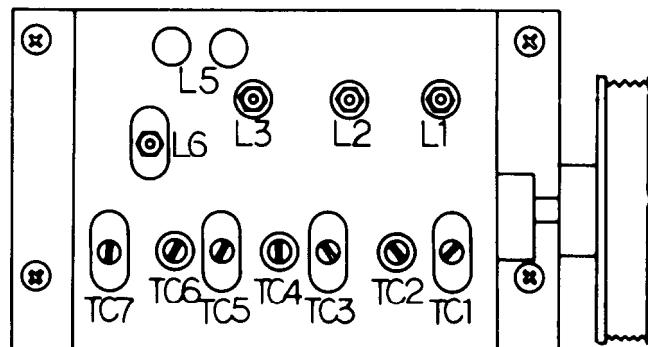


Step	Set Signal	Set Radio Dial	Adjust	VTVM reading	Remarks
1	515kHz 400Hz 30%	Lower end (515kHz)	L107	Maximum	Repeat steps 1 and 2 as necessary
2	1680kHz 400Hz 30%	Upper end (1680kHz)	TC5	Maximum	
3	600kHz 400Hz 30%	600kHz	L001	Maximum	Repeat steps 3 and 4 as necessary
4	1400kHz 400Hz 30%	1400kHz	TC2	Maximum	

## (3). FM FRONT END ALIGNMENT

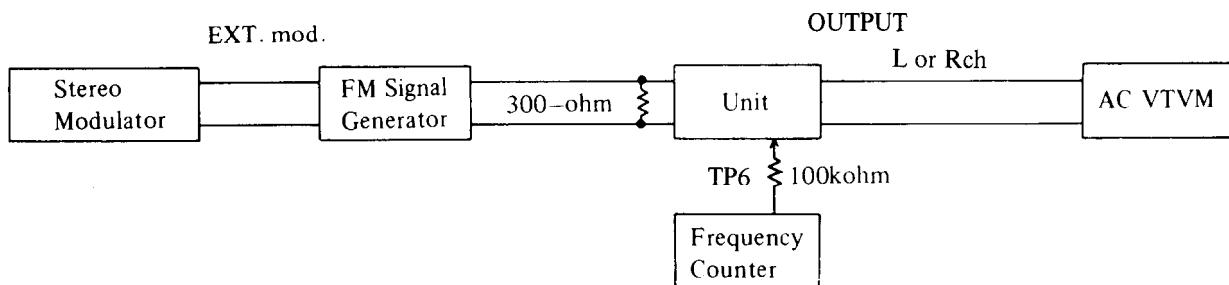


Step	FM Signal Generator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
1	No signal	Quiet Point	T101 Bottom	DC Voltmeter	OV	Repeat Steps 1 and 2 as necessary
2	98MHz 65dBf(60dB) 1kHz 75kHz devi.	98MHz	T101 Top	Distortion Analyzer	Minimum	
3	90MHz 65dBf(60dB) 1kHz 75kHz devi.	90MHz	L6	DC Voltmeter	OV	Repeat Steps 3 and 4 as necessary
4	106MHz 65dBf(60dB) 1kHz 75kHz devi.	106MHz	TC7		OV	
5	90MHz 20dBf(15dB) 1kHz 75kHz devi.	90MHz	L1 L2 L3	AC VTVM or Oscilloscope	Maximum	Repeat Steps 5 and 6 as necessary
6	106MHz 20dBf(15dB) 1kHz 75kHz devi.	106MHz	TC1 TC3 TC5		Maximum	
7	98MHz 65dBf(60dB) 1kHz 75kHz devi.	98MHz	L5	Distortion Analyzer	Minimum	



Front End Top View

## (4). MULTIPLEX ALIGNMENT



Step	FM Signal Generator	Stereo Modulator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
1	98MHz no mod. 65dBf (60dB)	_____	98MHz	R208	Frequency Counter	19,000±19Hz	
2	STEREO INDICATOR should light up when stereo program is being received.						
3	98MHz EXT. Mod. 65dBf (60dB)	Pilot Sig. 9% Main & Sub Sig. 1KHz Lch	98MHz	R224	AC VTVM Right ch.	Minimum	Repeat Steps 3 & 4 as neces- sary Same separation
4	Same as above	Pilot Sig. 9% Main & Sub Sig. 1KHz Rch	98MHz	R224	AC VTVM Left ch.	Minimum	

#### (5). QUARTZ LOCKED CIRCUIT ADJUSTMENT

1. Connect the signal generator to the 300ohm antenna terminals and the DC voltmeter to the detector output (pin nos. 10)
2. Set the SG output to 98MHz, 1kHz 75kHz devi., 65dBf (60dB).
3. Turn the tuner to 98MHz.
4. Adjust the voltage to 3.5V with a detector coil of L106.
5. Then connect the DC voltmeter to the AFC output terminal of TP-5.
6. Place the short circuit across TP-4 (pin nos. 10 and 11).
7. Adjust the semi-fixed resistor of R137 to bring the AFC output voltage to zero.
8. Remove the short circuit across TP-4.
9. Adjust the semi-fixed resistor of R130 to bring the AFC output voltage to zero.

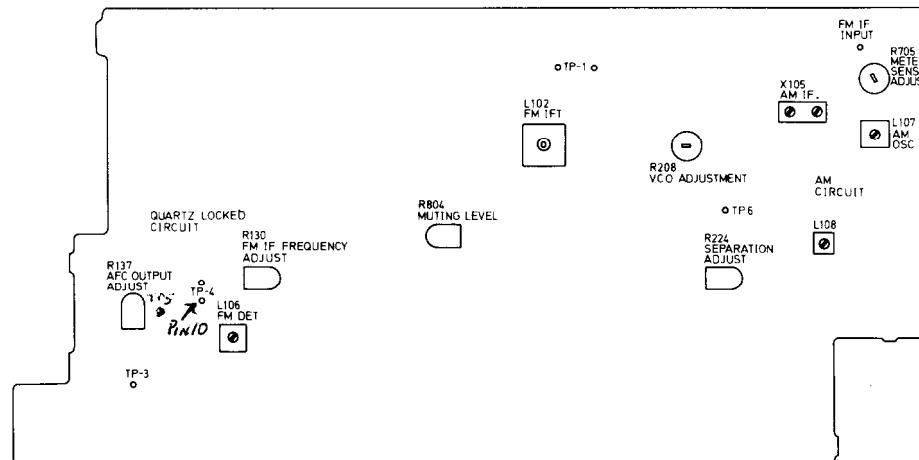
#### (6). RECORDING CHECK LEVEL ADJUSTMENT

1. Connect the signal generator to the 300 ohm antenna terminals and the AC voltmeter to the output terminals.
2. Set the SG output to 98MHz, 400 Hz 75kHz devi., 65dBf (60dB).
3. Turn the tuner to 98MHz.
4. Adjust the output level control to bring the output level to 300mV.
5. Push the RECORDING CHECK switch to ON.
6. Adjust the semi-fixed resistor of R251 to bring the output voltage to 150mV.

#### (7). SIGNAL STRENGTH INDICATOR ADJUSTMENT

1. Connect the signal generator to the 300ohm antenna terminals.
2. Set the SG output to 98MHz, 1kHz 75kHz devi. 65dBf (60 dB).
3. Turn the tuner to 98MHz.
4. Adjust the semi-fixed resistor of R705 to light up the 5th L. E.D.

NOTE: Only Universal model.



Adjustment Point

## AM/FM TUNER PC BOARD (NARF-636) – PARTS LIST (120V model)

CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUIT NO.	PARTS NO.	DESCRIPTION
	<b>ICs</b>				
Q101	222452	TA-7302P	C211, C212	352780221	2.2μF, 50V, Elect.
Q102	222540	HA-11225	C219, C220	352780101	1μF, 50V, Elect.
Q103	222468	BA-402	C223, C224	392880107	1μF, 50V, LL
Q105	222469	BA-661	C226	352743311	330μF, 16V, Elect.
Q106	222418	HA-1151	C227, C228	352784791	0.47μF, 50V, Elect.
Q201	222419	HA-1156W	C231, C232	352780101	1μF, 50V, Elect.
Q801	222465	NJM-4558D	C234	352743311	330μF, 16V, Elect.
Q901	222542	FS-7812M	C705	352741001	10μF, 16V, Elect.
	<b>Transistors</b>		C803	392883397	0.33μF, 50V, LL
Q104	2210123	2SC380(0)	C805	352780221	2.2μF, 50V, Elect.
Q107, Q202	2210746 or 2211255	2SC945(A)P or 2SC1815(GR)	C807	352780101	1μF, 50V, Elect.
Q203, Q204	2210746	2SC945(A)P	C808	352721011	100μF, 6.3V, Elect.
Q205-Q208	2211733	2SC1845(E)	C811	352780101	1μF, 50V, Elect.
Q209, Q815	2210746	2SC945(A)P	C812, C813	352743311	330μF, 16V, Elect.
Q802-Q812			C815	352742201	22μF, 16V, Elect.
Q816	2210746 or 2211255	2SC945(A)P or 2SC1815(GR)	C816	352784791	0.47μF, 50V, Elect.
Q902	2211454	2SA1015(Y)	C817, C823	352741001	10μF, 16V, Elect.
	<b>Diodes</b>		C818	352722211	220μF, 6.3V, Elect.
D101, D102	223105	1S1555	C819, C820	392880227	2.2μF, 50V, LL
D103	4000022	VD-1212	C821	352721011	100μF, 6.3V, Elect.
D104, D106	223105	1S1555	C905	352764711	470μF, 35V, Elect.
D201, D202			C906	352754711	470μF, 25V, Elect.
D801, D802	223103	1N60	C907, C822	352742211	220μF, 16V, Elect.
D803-D807	223105	1S1555	C909	352764711	470μF, 35V, Elect.
D814-D816			C910	352762211	220μF, 35V, Elect.
D817, D818	223103	1N60	C911, C912	352742211	220μF, 16V, Elect.
D819	223943 or 224011	RD4.7EB or YZ-047	C914	352734711	470μF, 10V, Elect.
D901	223862	WL-01			<b>Resistors</b>
D902	223924	WZ-130	R130	5225089	N10HR30KBC, Semi-fixed
D903	223858 or 223802	GP-08D or 1S1885	R137	5225056	N10HR5KBC, Semi-fixed
	<b>Coils</b>		R208	5225019	N10HR4.7KBD, Semi-fixed
L101	233144	NCH-1020	R224	5225055	N10HR2KBC, Semi-fixed
L103, L105	233105 or 233024	NCH-1005 or NCCH-1501	R241, R242	5148012	N16RG10KB35, Output level control
L104	233121	NCH-3012	R251	5225017	N10HR10KBC, Semi-fixed
L107	232065	NMO-2002	R804	5225058	N10HR50KBC, Semi-fixed
L201	233032A	NMC-8-7	R902	441724304	43Ω, 2W, Metal oxide film
L801	233122	NCH-3013			<b>Switch</b>
L802	233031	NMC-9-1	S201-S205	25035112	NPS-322-242-L77, Selector/Muting/Noise filter/De-empha. Rec. check
	<b>Transformers</b>				<b>Shielded plate</b>
L102	233143	NFIF-6008			27150103
L106	233120	NFIF-6006			<b>Radiator</b>
L108	232041	NIT-0509			27160029 RAD-07
	<b>Ceramic filters</b>				
X101	3010018	SFJ-10.7MA			
X102	3010024	SFE-10.7ML-A			
X103	3010006	SFE10.7MA(RED)			
X105	3010012	CFT-455B			
	<b>X'tal</b>				
X104	3010015	XTL-10.7M			
	<b>Capacitors</b>				
C107	352750471	4.7μF, 25V, Elect.			
C108, C239	352784791	0.47μF, 50V, Elect.			
C110	352721011	100μF, 6.3V, Elect.			
C114, C147	352780101	1μF, 50V, Elect.			
C116, C119	352741001	10μF, 16V, Elect.			
C129	352744701	47μF, 16V, Elect.			
C133, C146	352741001	10μF, 16V, Elect.			
C142	352742201	22μF, 16V, Elect.			
C150	352741011	100μF, 16V, Elect.			
C151	352741021	1,000μF, 16V, Elect.			
C173	372323614	360pF±5%, 50V, ST			
C178, C240	352741001	10μF, 16V, Elect.			
C179	352741011	100μF, 16V, Elect.			
C182	352780101	1μF, 50V, Elect.			
C183	352780331	3.3μF, 50V, Elect.			
C185	374124737	0.047μF±20%, 50V, DE			
C187	352741001	10μF, 16V, Elect.			
C201	352741001	10μF, 16V, Elect.			
C202	352741021	1,000μF, 16V, Elect.			
C203	374124737	0.047μF±20%, 50V, DE			
C204, C205	392884797	0.47μF, 50V, LL			
C206	392880107	1μF, 50V, LL			
C207	372325114	510pF±5%, 50V, ST			
C209	352742211	220μF, 16V, Elect.			

INDICATOR PC BOARD (NADIS-637)  
– PARTS LIST

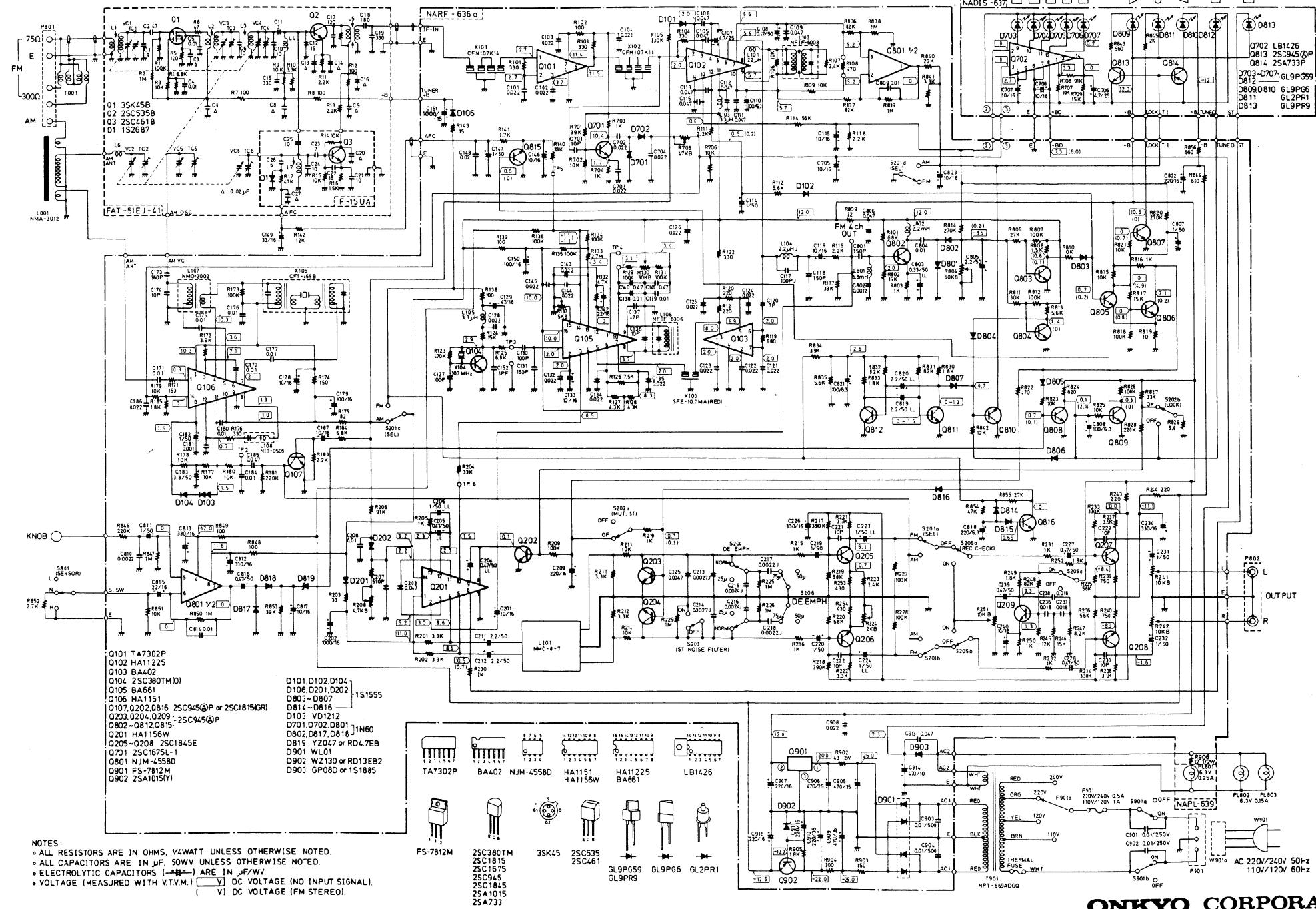
CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL801	211054	250mA, 6.3V, Pilot lamp
	<b>IC</b>	
Q702	222541	LB-1426
	<b>Transistors</b>	
Q813	2210746	2SC945A(P)
Q814	2210803	2SA733(P)
	<b>L.E.D.</b>	
D703-D707	225028	GL-9PG59, Green
D812	225031	GL-9PG-6, Triangle
D809, D810	225018	GL-2PR1, Red
D811	225029	GL-9PR9, Red
	<b>Capacitors</b>	
C706	352750471	4.7μF, 25V, Elect.
C707, C708	352741001	10μF, 16V, Elect.

NOTE: Capacitor: ST: Polystyrene film capacitor  
DE: Non-inductive polyester film capacitor  
LL: Low leakage current type electrolytic capacitor

# SCHEMATIC DIAGRAM

Model T-4090

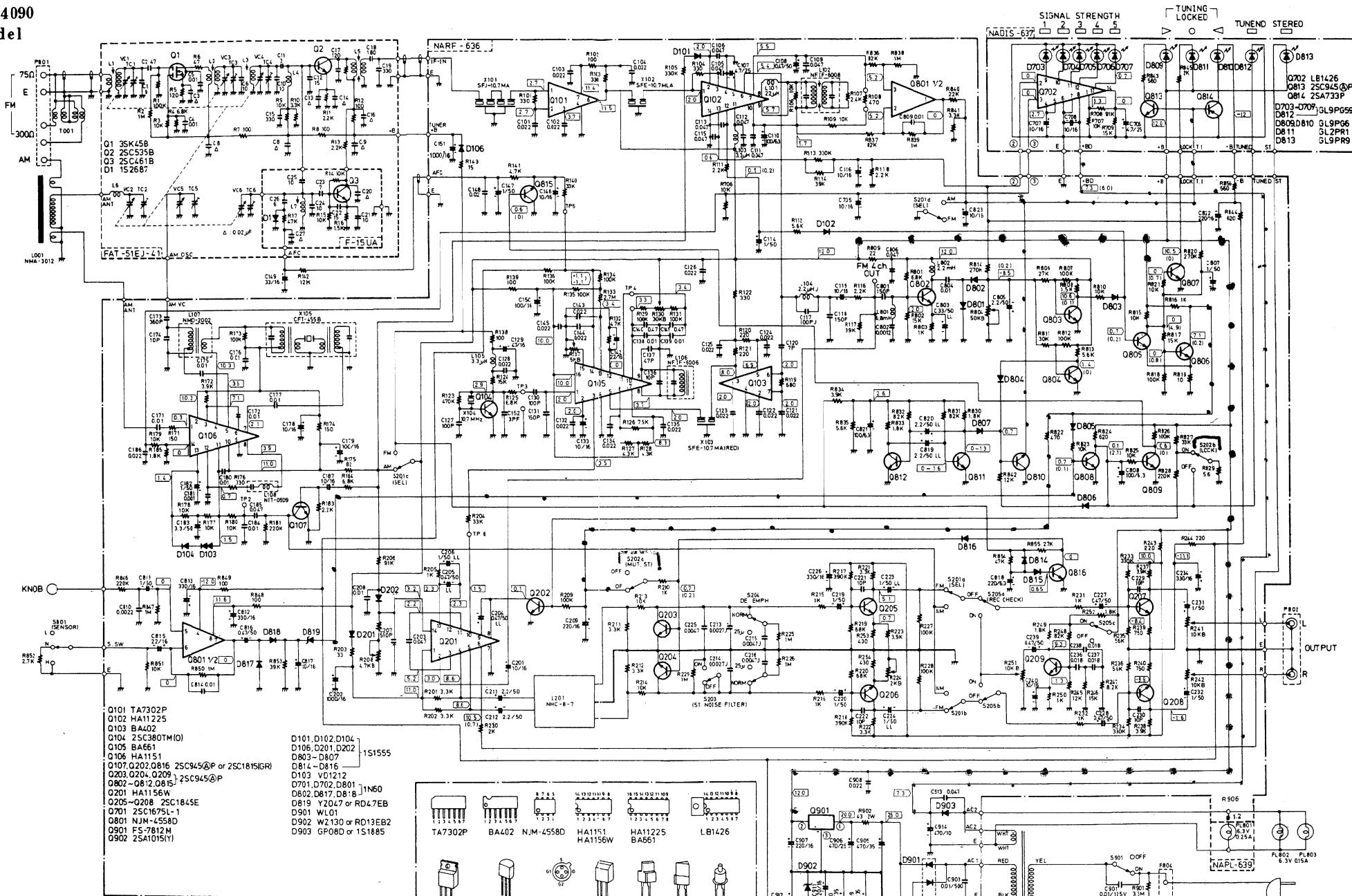
Universal model



## **SCHEMATIC DIAGRAM**

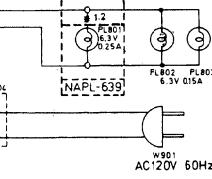
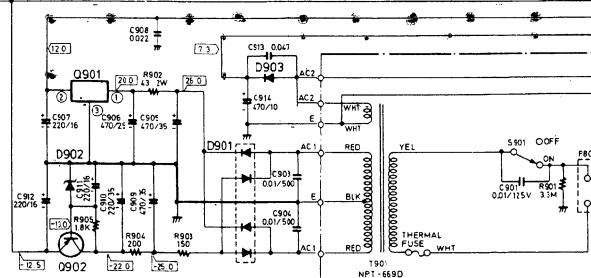
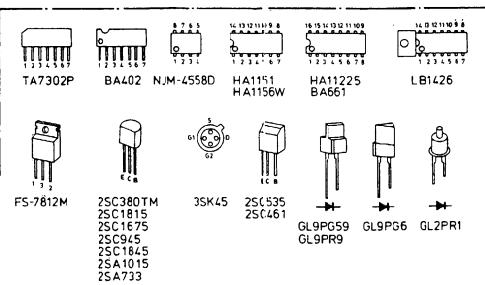
**Model T-4090**

120V model



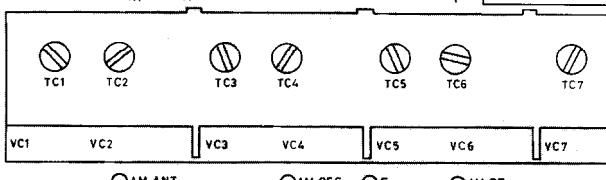
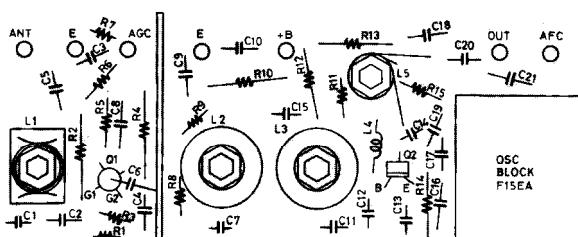
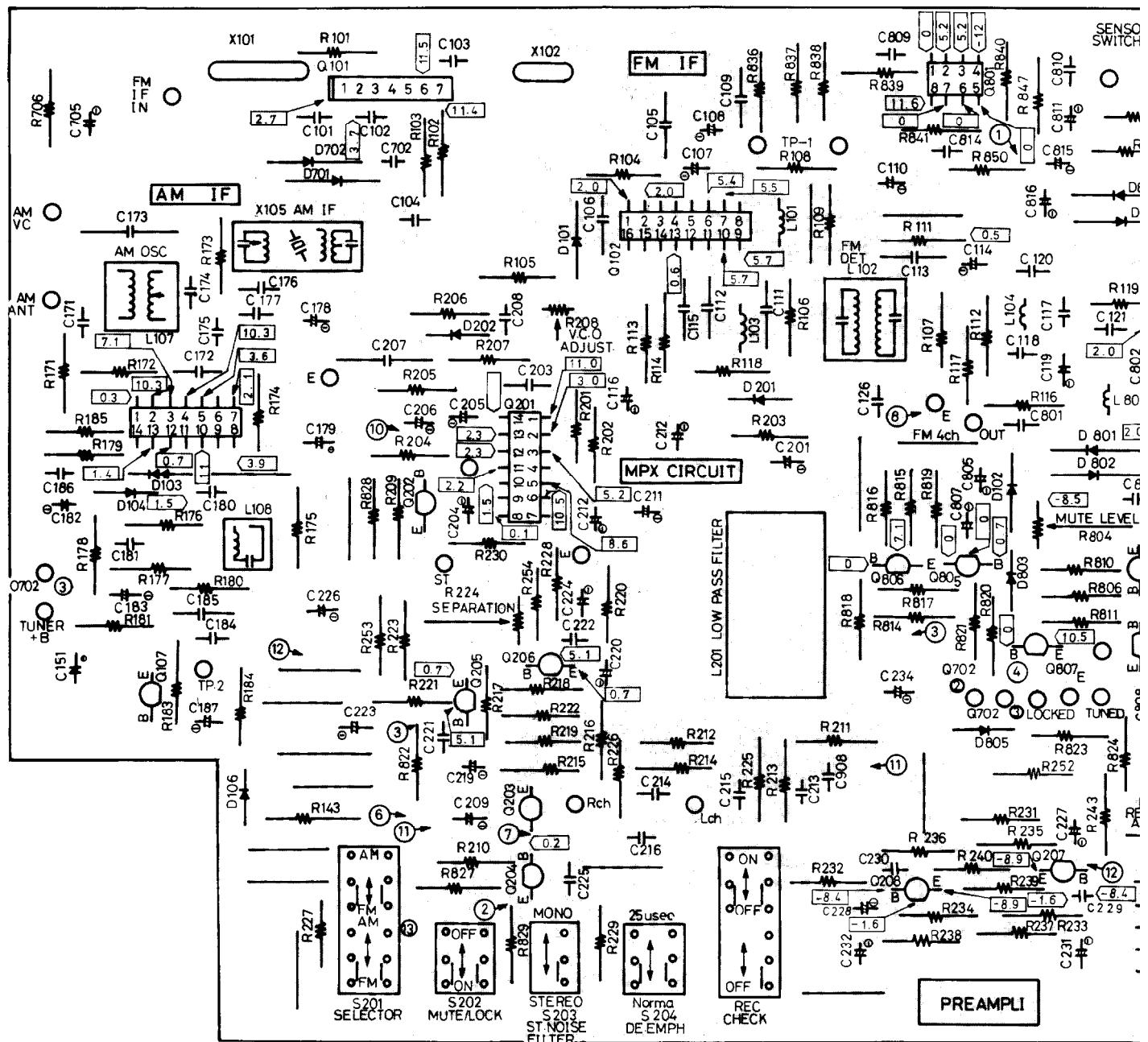
## NOTES

- ALL RESISTORS ARE IN OHMS, 1/2WATT UNLESS OTHERWISE NOTED.
  - ALL CAPACITORS ARE IN  $\mu$ F, 50V UNLESS OTHERWISE NOTED
  - ELECTROLYTIC CAPACITORS (~~—~~) ARE IN  $\mu$ F/WV.
  - VOLTAGE (MEASURED WITH VTVM) [ ] V DC VOLTAGE (NO INPUT SIGNAL).  
[ ] V DC VOLTAGE (FM STEREO).



**ONKYO CORPORATION**

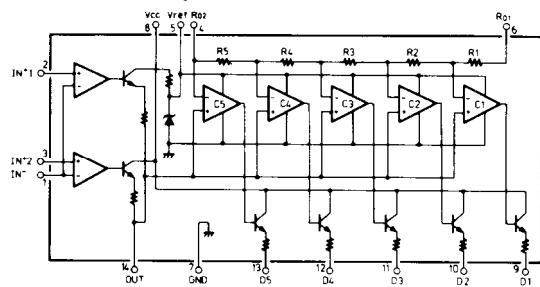
## **PRINTE CIRCUIT BOARD VIEW FROM BOTTOM SIDE 120V model**

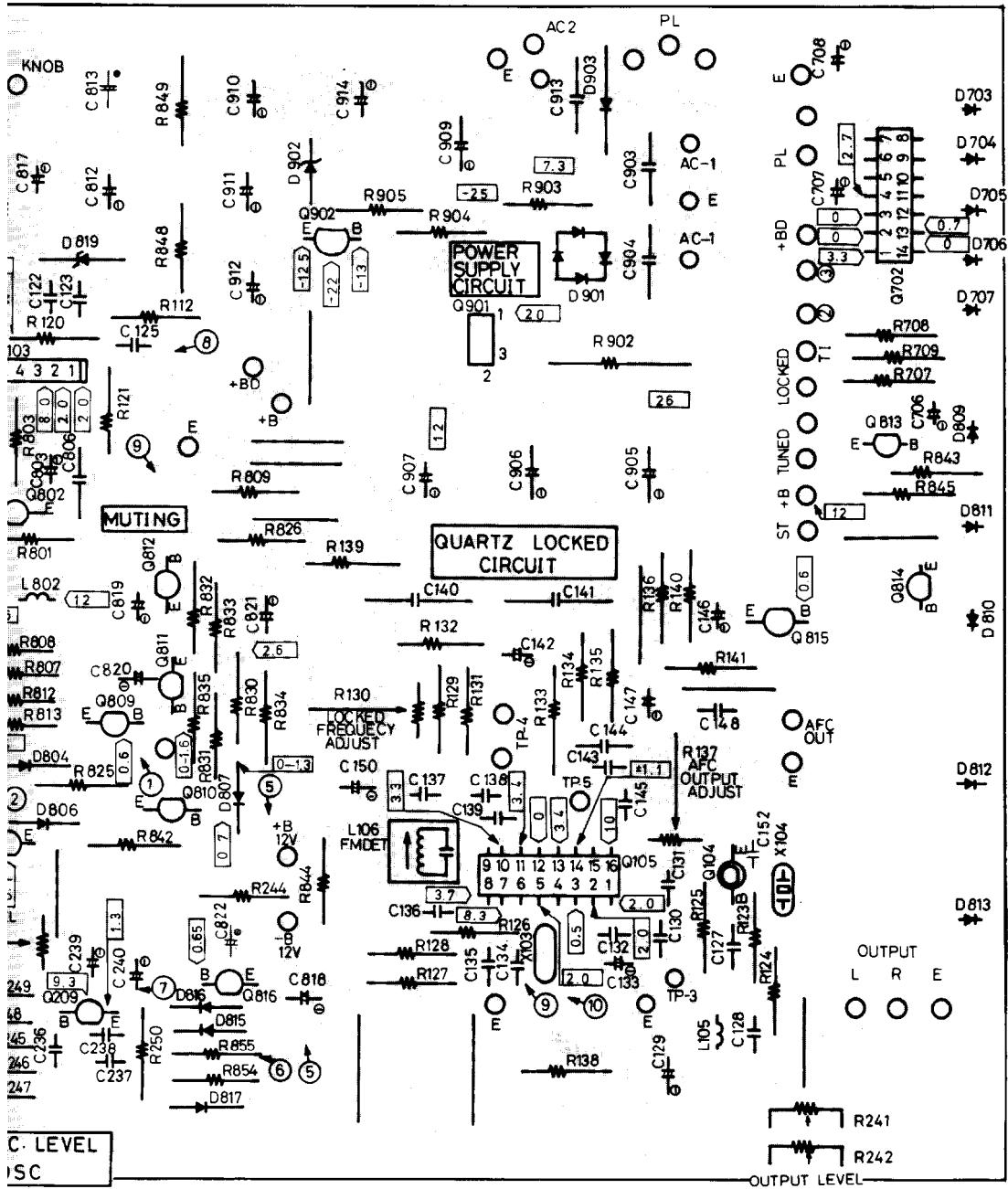


FAT-52-EJ-41 Bottom View

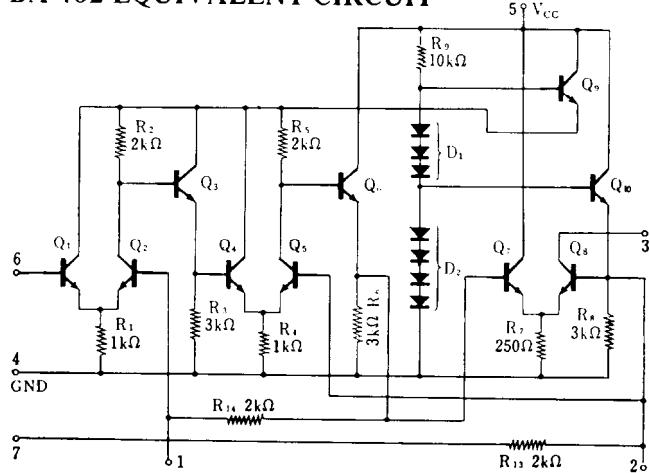
CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>Transistors</b>		
Q1		3SK45 (B)
Q2		2SC535 (B)
<b>OSC Block</b>		
	222013	F-15EA

## **LB-1426 EQUIVALENT CIRCUIT**

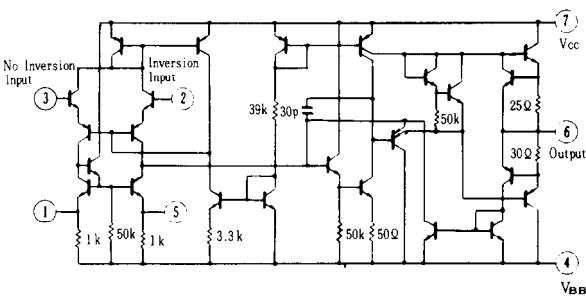




## **BA-402 EQUIVALENT CIRCUIT**

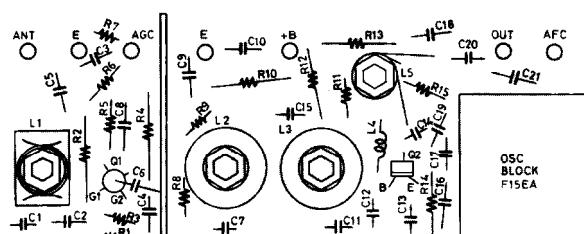
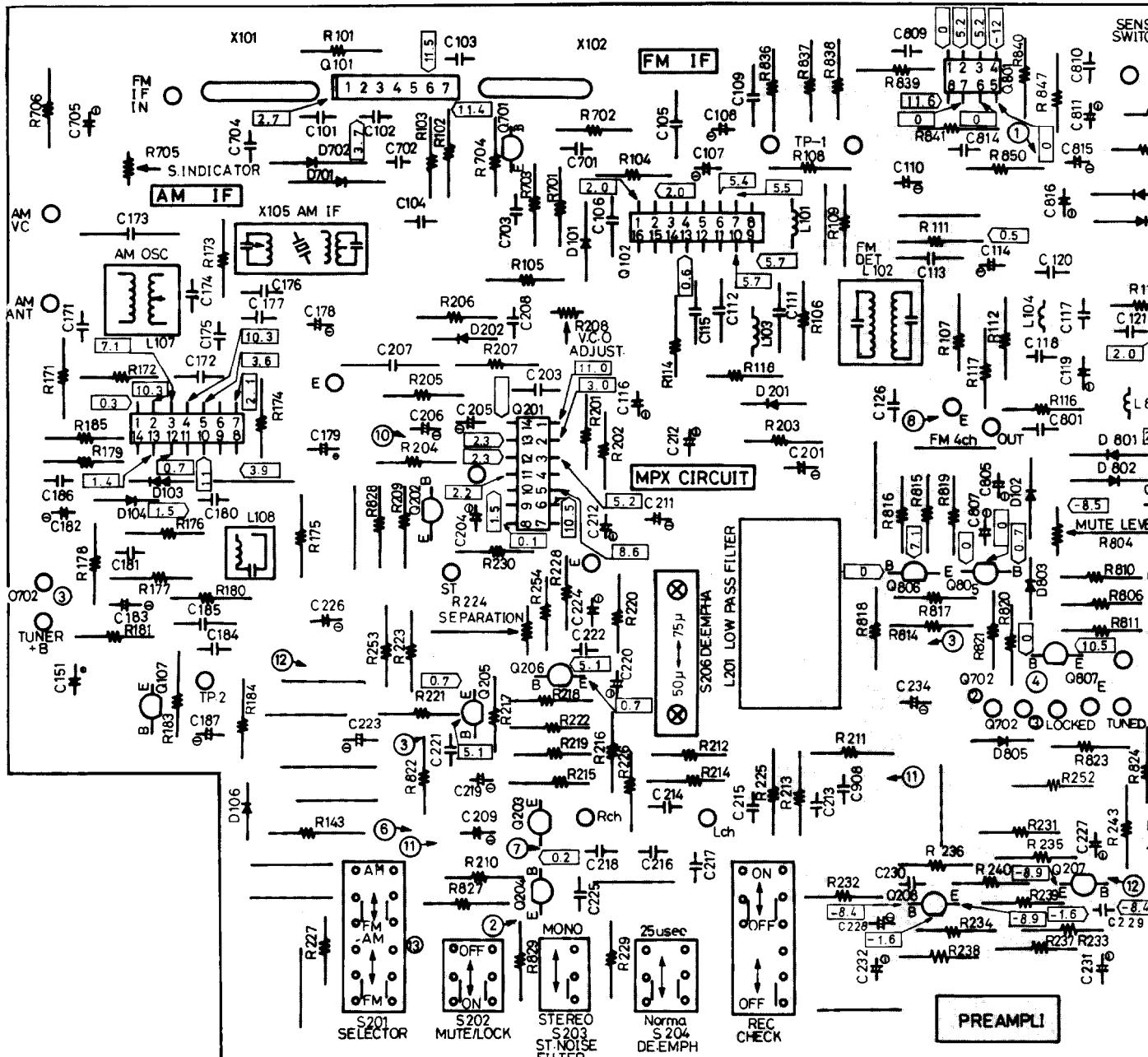


## TA-7302P EQUIVALENT CIRCUIT



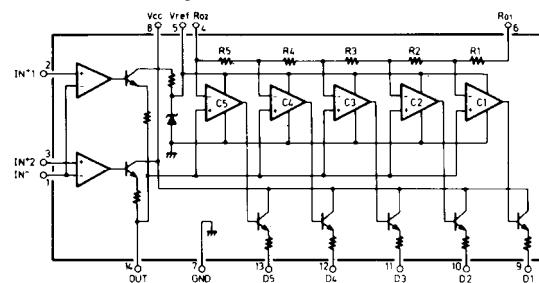
## **PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE**

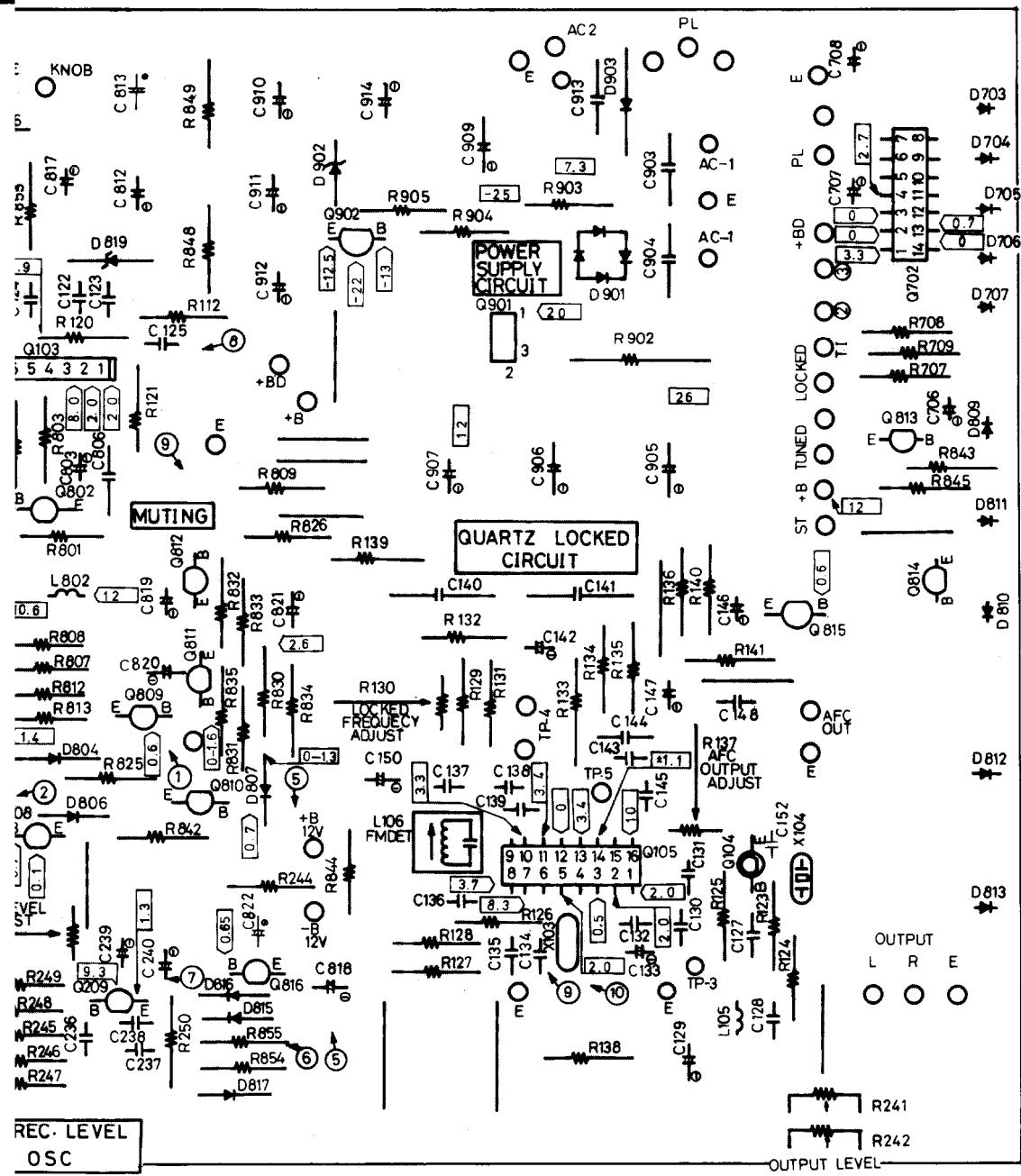
## Universal model



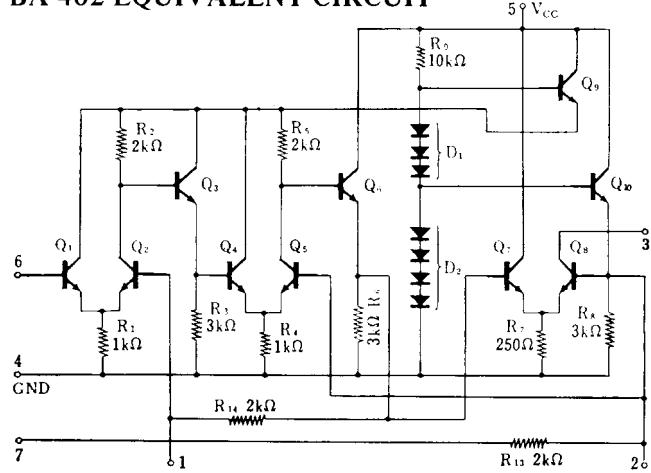
CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>Transistors</b>		
Q1		3SK45 (B)
Q2		2SC535 (B)
<b>OSC Block</b>		
	222012	E 15EA

## LB-1426 EQUIVALENT CIRCUIT

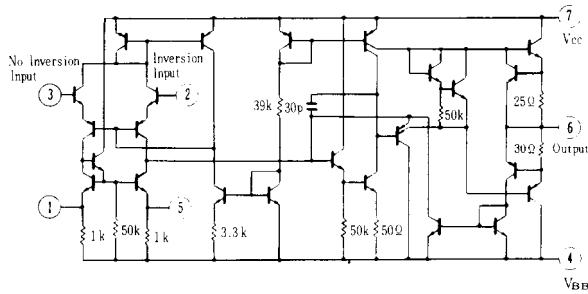




## BA-402 EQUIVALENT CIRCUIT



## **TA-7302P EQUIVALENT CIRCUIT**



## PRINTED CIRCUIT BOARD – PARTS LIST (Universal model)

FM/AM TUNER PC BOARD (NARF-636a)  
– PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>ICs</b>					
Q101	222452	TA7302P	C179	352741011	100μF, 16V, Elect.
Q102	222540	HA11225	C182	352780101	1μF, 50V, Elect.
Q103	222468	BA402	C183	352780331	3.3μF, 50V, Elect.
Q105	222469	BA661	C185	374124737	0.047μF±20%, 50V, DE
Q106	222418	HA1151	C187	352741001	10μF, 16V, Elect.
Q201	222419	HA1156W	C201	352741001	10μF, 16V, Elect.
Q801	222465	NJM-4558D	C202	352740121	1,000μF, 16V, Elect.
Q901	222542	FS-7812M	C203	374124735	0.047μF±20%, 50V, DE
<b>Transistors</b>					
Q104	2211823	2SC380TM(0)	C207	372325114	510pF±5%, 50V, ST
Q107, Q202	2210746 or 2211255	2SC945A(P) or 2SC1815(GR)	C209	352742211	220μF, 16V, Elect.
Q203, Q204	2210746	2SC945A(P)	C211, C212	352780221	2.2μF, 50V, Elect.
Q205-Q208	2211733	2SC1845(E)	C219, C220	352780101	1μF, 50V, Elect.
Q209	2210746	2SC945A(P)	C223, C224	392880107	1μF, 50V, LL
Q701	2210823	2SC1657(L-1)	C226	352743311	330μF, 16V, Elect.
Q802-Q812	2210746	2SC945A(P)	C227, C228	352784791	0.47μF, 50V, Elect.
Q815	2210746	2SC945A(P)	C231, C232	352780101	1μF, 50V, Elect.
Q816	2210746 or 2211255	2SC945A(P) or 2SC1815(GR)	C234	352743311	330μF, 16V, Elect.
Q902	2211454	2SA1015(Y)	C239	352784791	0.47μF, 50V, Elect.
<b>Diodes</b>					
D101-D102	223105	1S1555	C240	352741001	10μF, 16V, Elect.
D103	4000022	VD1212	C705	352741001	10μF, 16V, Elect.
D104, D106	223105	1S1555	C803	392883397	0.33μF, 50V, LL
D201, D202	223105	1S1555	C805	352780221	2.2μF, 50V, Elect.
D701, D702	223103	1N60	C807	352780101	1μF, 50V, Elect.
D801, D802	223103	1N60	C808	352721011	100μF, 6.3V, Elect.
D803-D807	223105	1S1555	C811	352780101	1μF, 50V, Elect.
D814-D816	223105	1S1555	C812, C813	352743311	330μF, 16V, Elect.
D817, D818	223103	1N60	C815	352742201	22μF, 16V, Elect.
D819	223943 or 224011	RD4.7EB or YZ-047	C816	352784791	0.47μF, 50V, Elect.
D901	223862	WL01	C817	352741001	10μF, 16V, Elect.
D902	223924	WZ-130	C818	352722211	220μF, 6.3V, Elect.
D903	223858 or 223802	GP08D or 1S1885	C819, C820	392880227	2.2μF, 50V, LL
<b>Coils</b>					
L101	233144	NCH-1020, 22μH	C821	352721011	100μF, 6.3V, Elect.
L103	233105 or 233024	NCH-1005 or NCCH-1501	C822	352742211	220μF, 16V, Elect.
L104	233121	NCH-3012	C823	352741001	10μF, 16V, Elect.
L105	233105 or 233024	NCH-1005 or NCCH-1501	C905	352764711	470μF, 35V, Elect.
L107	232065	NMO-2002	C906	352754711	470μF, 25V, Elect.
L201	233032A	NMC-8-7	C907	352742211	220μF, 16V, Elect.
L801	233122	NCH-3013	C909	352764711	470μF, 35V, Elect.
L802	233031	NMC-9-1	C910	352762211	220μF, 35V, Elect.
<b>Transformers</b>					
L102	233143	NFIF-6008	C912	352742211	220μF, 16V, Elect.
L106	233120	NFIF-6006	C914	352734711	470μF, 10V, Elect.
L108	232041	NIT-0509	R130	5225089	Resistors
X101, X102	3010028	CFM107K14	R137	5225056	N10HR30KBC, Quartz lock circuit
X103	3010006	SFE10.7MA(RED)	R208	5225019	adjust, variable
X105	3010012	CFT-455B	R224	5225018	N10HR5KBC, Quartz lock circuit
X104	3010015	XTL-10.7M	R241, R242	5148012	N10HR4.7KBD, V.C.O. adjust,
<b>Ceramic filters</b>					
X101, X102	3010028	CFM107K14	R251	5225017	variable
X103	3010006	SFE10.7MA(RED)	R705	5225034	N10HR2KBC, Separation adjust,
X105	3010012	CFT-455B	R804	5225058	variable
<b>X'tal</b>					
X104	3010015	XTL-10.7M	R902	441724304	N16RG10KB35, Output level
<b>Capacitors</b>					
C107	352750571	4.7μF, 25V, Elect.	S201-S205	25035112	adjust, variable
C108	352784791	0.47μF, 50V, Elect.	S206	250142	N10HR10KBC, Rec. check level
C110	352721011	100μF, 6.3, Elect.			adjust, variable
C114	352780101	1μF, 50V, Elect.			N10HR47KBD, Strength meter
C116	352741001	10μF, 16V, Elect.			adjust, variable
C119	352741001	10μF, 16V, Elect.			N10HR50KBC, Muting level adjust,
C129	352744701	47μF, 16V, Elect.			variable
C133	352741001	10μF, 16V, Elect.			43Ω, 2W, Metal oxide film
C142	352742201	22μF, 16V, Elect.			
C146	352741001	10μF, 16V, Elect.			
C147	352780101	1μF, 50V, Elect.			
C150	352741011	100μF, 16V, Elect.			
C151	352741021	1,000μF, 16V, Elect.			
C173	372323614	360pF±5%, 50V, ST			
C178	352741001	10μF, 16V, Elect.			
<b>Switches</b>					
					NP-322-242-L77, Selector/Muting/
					Stereo noise filter/De-emphasis/
					Rec. check/
					NSS-2225, De-emphasis
<b>Shielded case</b>					
			27150103		X'tal oscillator
<b>Radiator</b>					
			27160029		RAD-07
<b>LAMP PC BOARD (NAPL-639) – PARTS LIST</b>					
CIRCUIT NO.	PARTS NO.	DESCRIPTION			
PL801	210064	250mA, 6.3V, Pilot lamp			

## **INDICATOR PC BOARD (NADIS-637) - PARTS LIST**

CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUIT NO.	PARTS NO.	DESCRIPTION
Q702	222541	IC LB-1426	D811	225018	GL-2PR1, Red
			D813	225029	GL-9PR9, Red
Q813	2210746	Transistors 2SC945A(P)			Capacitors
Q814	2210803	2SA733(P)	C706	352750471	4.7µF, 25V, Elect.
			C707, C708	352741001	10µF, 16V, Elect.
D703-D707	225028	L.E.Ds GL-9PG59, Green			NOTE: Capacitor: ST: Polystren film capacitor
D812					DE: Non-inductive polyester f
D809, D810	225031	GL-9PG6, Triangle			LL: Low leakage current type capacitor

**NOTE:** Capacitor: ST: Polystyrene film capacitor  
DE: Non-inductive polyester film capacitor  
LL: Low leakage current type electrolytic capacitor

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